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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/797,046

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Jung-hyun Lee

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EXAMINER

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/797,046	<b>Applicant(s)</b> LEE ET AL.	
	<b>Examiner</b> Ori Nadav	<b>Art Unit</b> 2811	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 22 and 23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 22 and 23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Objections***

Claim 22 is objected to because of the following informalities: The phrase "am upper" should read "an upper". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cabral Jr. et al. (6,982,230) in view of Seidl et al. (2002/0014647) and Chang et al. (3,996,021). Cabral Jr. et al. teach in figure 29 and related text a capacitor of a semiconductor device, the capacitor comprising:

- a lower electrode 33 formed on a semiconductor substrate 30;
- a first dielectric film 34 formed on the lower electrode;
- an upper electrode 35 formed on the first dielectric film; and
- a second dielectric film 34 (see column 14, lines 45-47) between the upper electrode and the film,

wherein the second dielectric film is an HfO<sub>2</sub> layer, a ZrO<sub>2</sub> layer, or an STO layer, and

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wherein the second dielectric film is directly in contact with the upper electrode. Cabral Jr. et al. do not teach using an AHO ( $(\text{Al}_x\text{Hf}_{1-x})\text{O}_y$ ) film as the first dielectric film. Seidl et al. teach in figure 1n and related text a capacitor comprising a lower electrode 60, an AHO ( $(\text{Al}_x\text{Hf}_{1-x})\text{O}_y$ ) film 70 formed directly on the lower electrode, and an upper electrode 80 formed on the AHO ( $(\text{Al}_x\text{Hf}_{1-x})\text{O}_y$ ) film. Chang et al. teach the advantages of using an AHO ( $(\text{Al}_x\text{Hf}_{1-x})\text{O}_y$ ) film (column 6, lines 33-50).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to replace the first dielectric film in Cabral Jr. et al.'s device with an AHO ( $(\text{Al}_x\text{Hf}_{1-x})\text{O}_y$ ) film, as taught by Seidl et al., in order to improve the device characteristics.

The combination is motivated by the teachings of Chang et al. who point out the advantages of using an AHO ( $(\text{Al}_x\text{Hf}_{1-x})\text{O}_y$ ) film (column 6, lines 33-50).

Note that substitution of materials is not patentable even when the substitution is new and useful. *Safetran Systems Corp. v. Federal Sign & Signal Corp.* (DC NIII, 1981) 215 USPQ 979.

Note further that the combined device includes a second dielectric film having a dielectric constant that is higher than that of the second dielectric film.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cabral Jr. et al. and Chang et al. and Seidl et al., as applied to claim 22 above, and further in view of Chooi et al. (6,486,080).

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Cabral Jr. et al., Chang et al. and Seidl et al. teach substantially the entire claimed structure, as applied to claim 22 above, except an oxidation barrier film formed between the lower electrode and the AHO ( $(\text{Al}_x\text{Hf}_{1-x})\text{O}_y$ ) film.

Chooi et al. teach an oxidation barrier film formed between the lower electrode and the AHO ( $(\text{Al}_x\text{Hf}_{1-x})\text{O}_y$ ) film (column 2, lines 16-20).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an oxidation barrier film formed between the lower electrode and the AHO ( $(\text{Al}_x\text{Hf}_{1-x})\text{O}_y$ ) film in prior art's device, in order to improve the device characteristics.

### ***Response to Arguments***

Applicants argue that “one of ordinary skill in the art would not have been motivated to modify Cabral's capacitor to include the AHO layer of Chang, because Chang's AHO film would be used to coat a metal article in Cabral, which is not suggested because the technical field of Cabral is not related to coating a metal article”.

Chang et al. was not cited to motivate an artisan “to modify Cabral's capacitor to include the AHO layer of Chang”, as argued by applicants. Chang et al. was cited to teach an artisan the advantages of using an AHO ( $(\text{Al}_x\text{Hf}_{1-x})\text{O}_y$ ) material versus other materials. Seidl et al., on the other hand, was cited to motivate an artisan to replace the inferior dielectric material in Cabral Jr. et al.'s device with an AHO ( $(\text{Al}_x\text{Hf}_{1-x})\text{O}_y$ ) material.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

O.N.  
4/7/2011

/ORI NADAV/  
PRIMARY EXAMINER  
TECHNOLOGY CENTER 2800